Hannover Re

Impacts of COVID-19 on Mortality Studies

2025 SEAC

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somewhat different

Agenda

- COVID-19 Pandemic
- What is an experience study?
- Pandemic Experience Options
- Future Mortality Considerations
- Outstanding Questions

Presenter Background

Arpit Mehta, FSA, MAAA

Assistant Vice President & Actuary

10 years industry experience

– 6 years at Hannover Re

Lead the Corporate Actuarial Assumptions team

– Annual experience studies
– Mortality, Lapses, etc.

COVID-19 Pandemic – Recap

A Paradigm Shift for Mortality Analysis

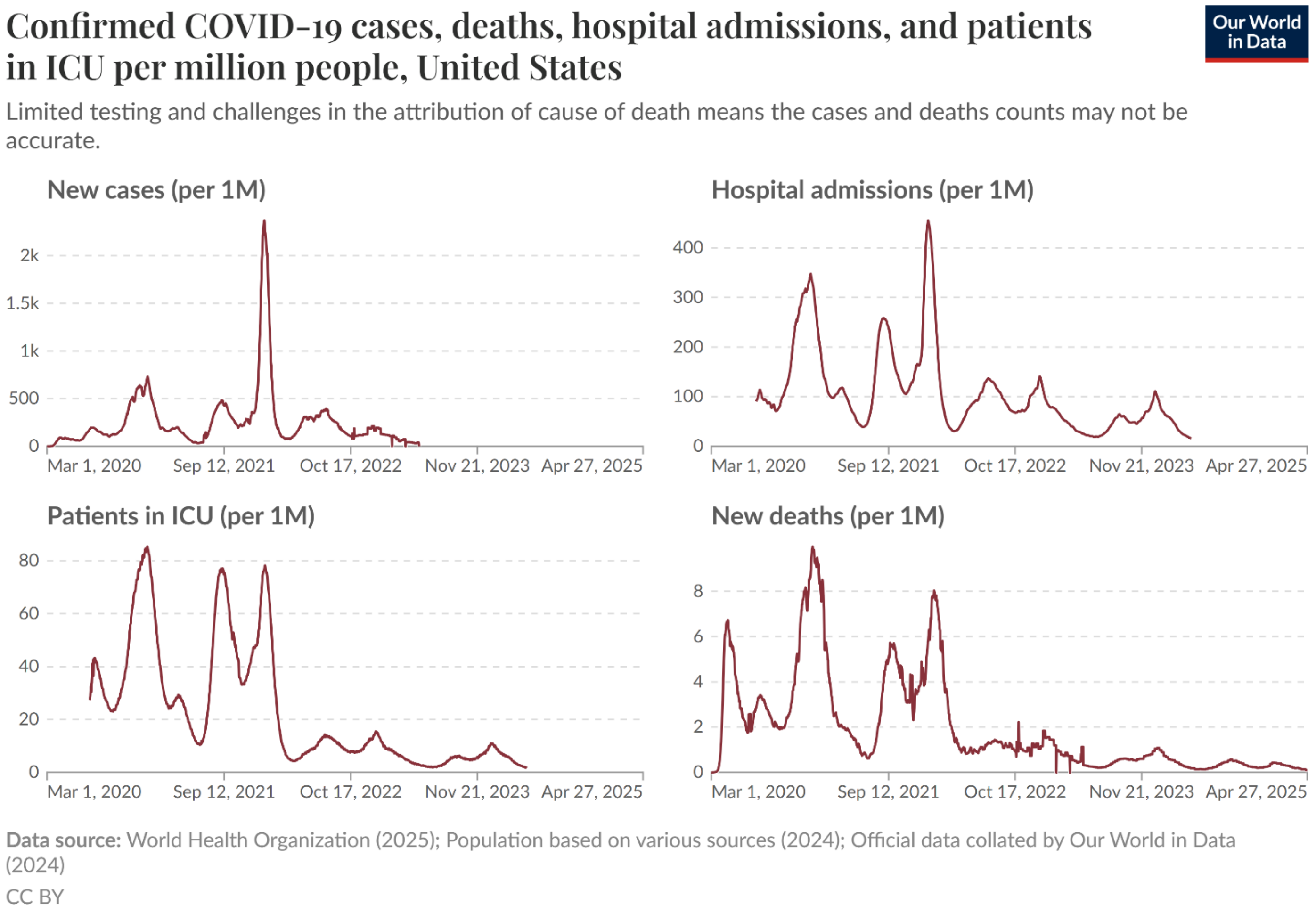
- Pandemic Declared (WHO): March 2020
- Global Health Emergency Ended (WHO): May 2023
- Ongoing circulation continues to influence mortality & morbidity

Global & U.S. Mortality Snapshot (Approx. as of May 2025):

- Global Deaths: ~7.1 million (WHO)
- U.S. Deaths: ~1.2 million (CDC)
- *Note: Data reflects reported deaths; actual impact likely higher. Reporting standards have varied.*

COVID-19 Pandemic – Key Challenges for Insurers

- Significant Excess Mortality
- Disrupted Mortality Improvement
- Long COVID uncertainty
- Socioeconomic Nuances
- Geographical Variations
- Data Challenges



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What is an Experience Study?

Definition

– *A systematic comparison of a company's actual historical results (e.g., mortality, lapse) against expected outcomes, which are based on actuarial assumptions for a defined population and period*

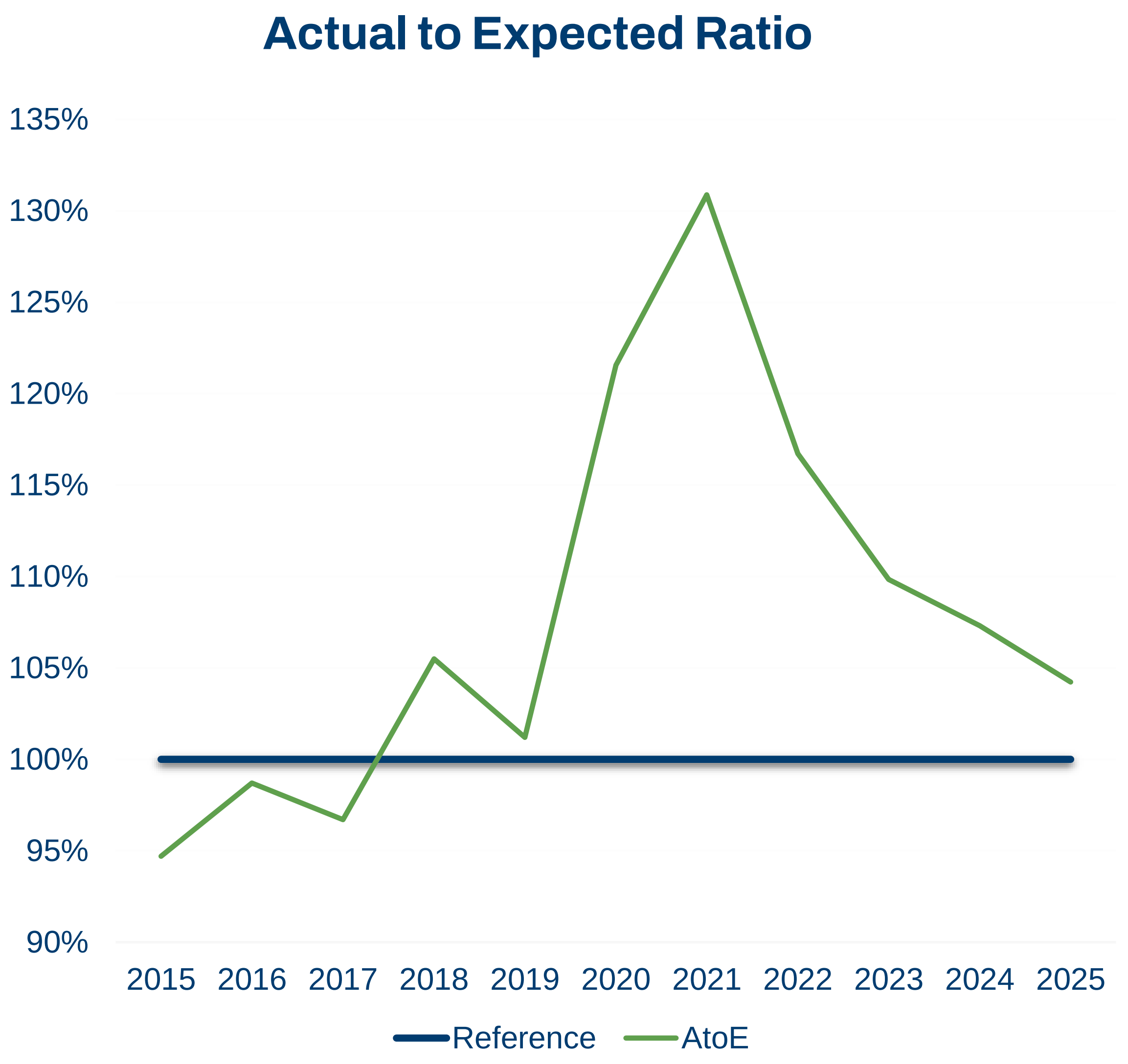
Mortality Experience Studies

– Analyze historical data & real-life outcomes to assess modeling assumptions
– "Actual-to-Expected" (AtoE) ratio

Goal

– Maintain sound, data-driven assumptions
– Align financial projections with actual performance

Example – Raw Experience



2015-2025

– *Note: Randomized experience*

Overall AtoE = 108%

2015 to 2019 AtoE = 99%

2020 to 2025 AtoE = 115%

How should insurers proceed?

Experience Data Options

1

Do not use any experience from the pandemic years

2

Use the experience with no adjustments

3

Make an adjustment

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Pandemic Adjustment – Background

Experience study goal:

- Review experience and, more importantly, set long-term mortality assumption
- Remove the impacts of the pandemic period from the data
  - Explicit Covid
  - Pandemic Related Excess

How to adjust?

- Adjusting the elevated claims lower is not practical → Which claims?
- Better to adjust the expected claims higher → How much?
- Data Sources
  - Internal Experience
  - Industry Data (SOA Studies)
  - Population Data (CDC, Highest Socioeconomic)

Pandemic Adjustment – Methodology

Initial Approach:

- Allocate all excess to pandemic → Overfit concerns
- Simple, but not recommended

Adjusted Approach:

- Allocate excess to pandemic until within 95% confidence interval

Pandemic Adjustment – Methodology

Dimensions to consider for adjustment:

- **Calendar year**
- **Age**
- Underwriting method
- Socioeconomic status
- Geographic location

Pandemic Adjustment – Example

Calendar Year = 2023

Actual to Expected = 110%

Adjustment

– Pandemic Adjustment for 2023 = 6%

– Increase Expected by 6%

– Actual to Expected_Pandemic Adj = 104%

Example – With Pandemic Adjustments

2015 to 2019

– AtoE = 99%

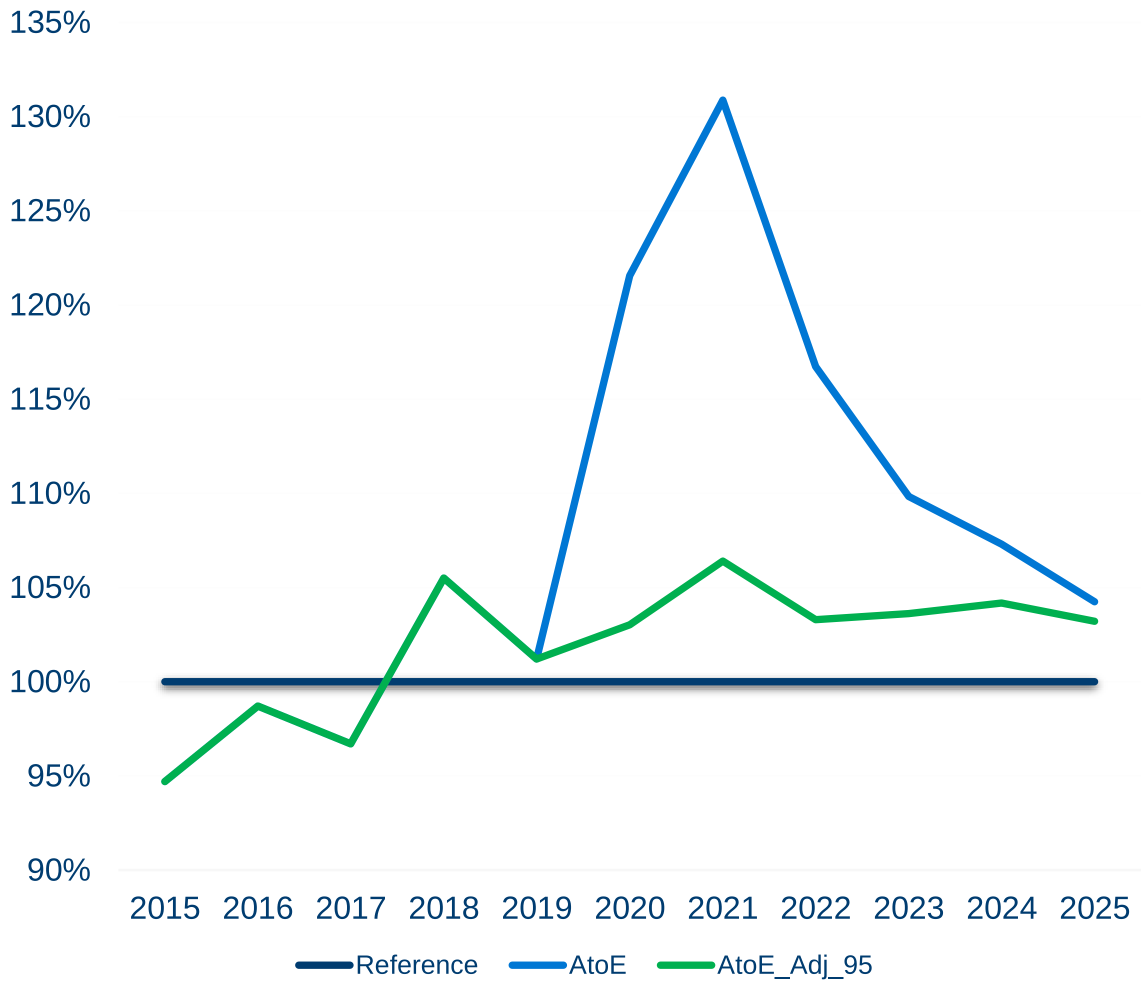
2020 to 2025

– Raw AtoE = 115%

– 95th Percentile Pandemic Adjusted AtoE = 102%

With pandemic adjusted data, we can conduct a normal experience study, but what about future mortality?

Actual to Expected Ratio



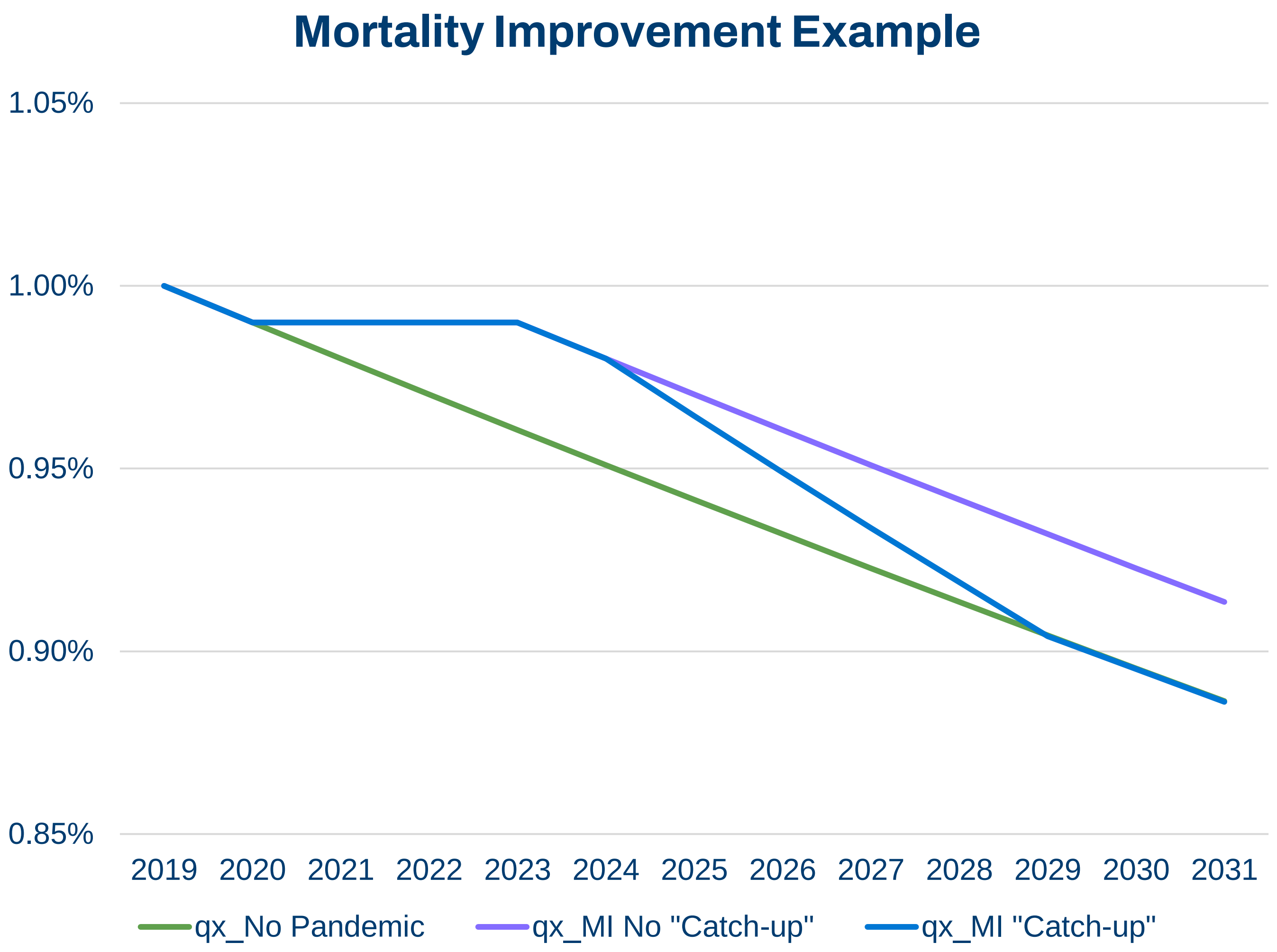
Future Mortality Considerations

Mortality remains elevated

Mortality Improvement unknown

Potential Options:

- MI “Catch-up” → Medium Term Endemic Adjustment
  - Accelerating MI back to pre-pandemic trends
- No MI “Catch-up” → Period effect adjustment
  - New baseline
  - Mortality improvement stall
  - Ongoing impacts from Long-COVID



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Outstanding Questions

Overall baseline mortality rates (the “new normal”)

– Endemic level of COVID mortality

Future Mortality Improvement

Long COVID Impacts

Unknown unknowns

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